

FLORIDA HIGHWAYS



Along the Indian River on State Road No. 4.

Vol. II

SEPTEMBER, 1925

No. 10

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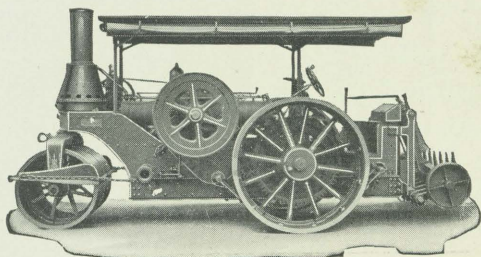
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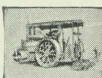
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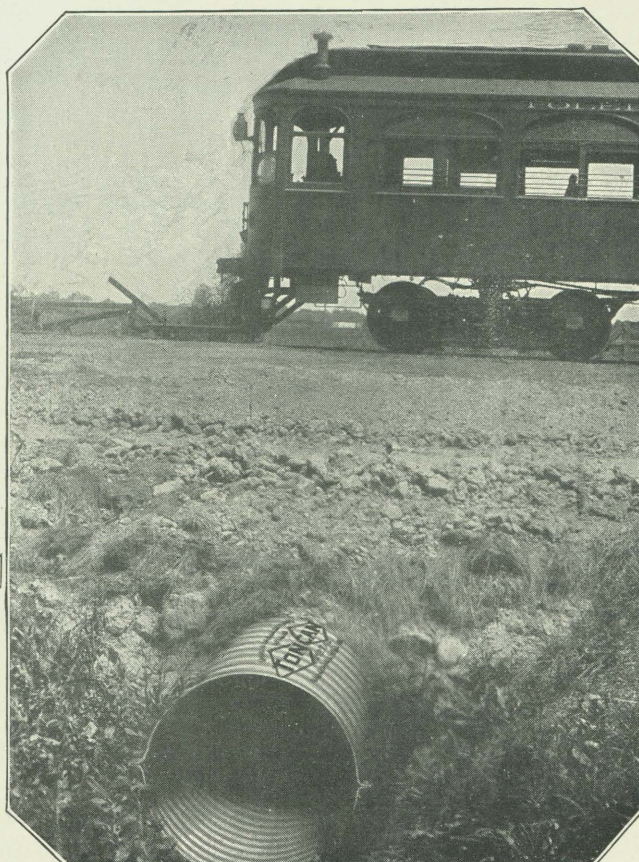
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FLORIDA HIGHWAYS



Vol. II

SEPTEMBER, 1925

No. 10

Transactions of State Road Department at a Special Meeting, August 10, 1925

The State Road Department met in special session at its offices in the city of Tallahassee on Monday, August 10th, 1925, at 10 o'clock A. M., pursuant to the following call issued by the Chairman:

"Tallahassee, Fla., July 28, 1925.

"Capt. W. J. Hillman, Live Oak, Fla.

"Mr. J. H. Bayliss, Pensacola, Fla.

"Mr. E. P. Green, Bradenton, Fla.

"Mr. I. E. Schilling, Miami, Fla.

"Members State Road Department of Florida.

"Gentlemen:

"A special meeting of the State Road Department is hereby called to be held at Tallahassee, August 10, 1925, at 10 o'clock in the forenoon for the transaction of such business as may be deemed necessary and convenient by the Department.

"Given under my hand as Chairman, at Tallahassee, this the 28th day of July, A. D. 1925.

"(Signed) F. A. Hathaway,

"Attest: "Chairman, State Road Department.

"(Signed) Ella Creary Thompson,

"Secretary."

There were present: Messrs. F. A. Hathaway, Chairman; W. J. Hillman, I. E. Schilling and J. Harvey Bayliss, members; Ella Creary Thompson, Secretary; J. L. Cresap, State Highway Engineer, and B. A. Meginniss, Attorney.

Mr. J. Harvey Bayliss of Pensacola met for the first time with the Department as the member thereof from the Third Congressional District, having been appointed thereto by the Governor to succeed Mr. W. M. Corry, resigned, and having duly qualified by taking and prescribing the oath of office and giving bond as required by the statute.

The minutes of the regular quarterly meeting held July 2, 1925, and of the special meeting held July 25, 1925, were read, and upon motion, duly approved.

LaFayette County

Judge Hal W. Adams appeared before the Department requesting that the Department agree to take over the proceeds of a bond issue shortly to be authorized in Lafayette County, and expend the same for the county in the construction of State Road No. 5-A. Capt. Hillman offered a resolution, which he subsequently withdrew and action on this matter was deferred until the October meeting of the Department.

Dade County—Project 41

Upon motion of Mr. Schilling, seconded by Capt. Hillman and carried, the following resolution was adopted:

Resolved, That the Chairman of this Department

be and he is hereby authorized to advertise for bids returnable September first, 1925, for the construction of Federal Aid Project No. 41, Dade County, between Miami and the Broward County line.

Dade County—Project 41

Upon motion of Mr. Schilling, seconded by Mr. Bayliss, the following resolution was unanimously adopted:

Whereas, the Department has surveyed and located State Road No. 4 in Dade County, as is shown by plat of said location on file in its office; and

Whereas, said Department has found and determined that it is necessary, wise and expedient to secure, by purchase or condemnation, sufficient lands as will make a width of 33 feet on each side of the center line, as shown on said location plat, for the purpose of the right of way for said State Road No. 4; Now, therefore,

Be it resolved, That the County Commissioners of Dade County be and they are hereby authorized and requested to secure for the Department by purchase or condemnation the said lands necessary for said purposes;

Be it further resolved, That said County Commissioners be and they are hereby authorized through their counsel to prepare and sign all necessary pleadings and affidavits, and take all steps necessary and required by the laws of Florida in condemnation proceedings for State Road purposes, and that they be and they are hereby authorized to use the name of this Department in any condemnation proceedings necessary to carry out the purposes of this resolution, or to proceed in their own name as authorized by law;

Be it further resolved, That in the event that they shall elect to proceed in the name of this Department, that their attorneys be and they are hereby authorized to prepare, execute and file all necessary pleadings, affidavits and documents in connection therewith, and to prosecute such action to completion.

Project 669-B, Dade County—Road 27

Upon motion of Mr. Schilling, seconded by Capt. Hillman, the following resolution was adopted:

Whereas, the bid of M. C. Winterburn, Inc., Jacksonville, Florida, is lowest for the construction of Project No. 669-B, Road No. 27, Dade County, now therefore,

Be it resolved, That the Chairman be and he is authorized to enter into contract with said M. C. Winterburn, Inc., for the construction of said Project 669-B at the price submitted in its proposal and on the further basis of its letter accompanying same and made a part thereof as a special provision.

Washington and Holmes Counties—Road No. 1

Upon motion of Capt. Hillman, seconded by Mr. Bayliss, the following resolution was adopted:

Be it resolved, That the Chairman and Mr. Bayliss, member from the Third Congressional District, be and they are hereby authorized and empowered to definitely locate the routing of State Road No. 1 between Chipley and Caryville, and upon locating same that the Chairman be and he is authorized to advertise for bids for clearing, grubbing and grading the same.

Pipe Crossing Agreement With Florida East Coast Railway Company

Upon motion of Mr. Schilling, seconded by Mr. Bayliss, the following resolution was unanimously adopted:

Be it resolved, by the State Road Department of the State of Florida, That this Department does hereby consent and enter into a pipe crossing agreement with the Florida East Coast Railway Company for the installation of a drain pipe of State Road Department of the State of Florida at a point two thousand one hundred feet westerly from said railway company's Orange City branch mile post No. 25, and according to other terms and conditions of said agreement attached hereto and made a part hereof.

Be it further resolved, That the Chairman of this Department, together with the attestation of Secretary of said State Road Department, are hereby authorized and directed to execute said agreement for and on behalf of this Department.

Pipe Crossing Agreement With Florida East Coast Railway Company

Upon motion of Mr. Schilling, seconded by Mr. Bayliss, the following resolution was adopted:

Be it resolved by the State Road Department of the State of Florida, That this Department does hereby consent and enter into a pipe crossing agreement with Florida East Coast Railway Company for the installation of drain pipes of the State Road Department of the State of Florida at locations described as follows:

(1) Fifteen (15) feet west of the east line of Volusia avenue, being also one thousand eight hundred four (1,804) feet westerly from said railway company's A. & W. branch mile post No. 25.

(2) Fifteen (15) feet east of the west line of Volusia avenue, being also one thousand eight hundred thirty-four (1,834) feet westerly from said railway company's A. & W. branch mile post No. 25.

Be it further resolved, That the Chairman of this body, together with the attestation of the Secretary of the Department, are hereby authorized and directed to execute said agreement for and on behalf of this Department.

Brevard County—Road 4

Upon motion of Mr. Schilling, seconded by Mr. Bayliss, the following resolution was adopted:

Resolved, That the Chairman be and he is hereby authorized and directed, without further reference to this body, to make application to the War Department for the approval of the construction of a bridge over Turkey Creek, located on State Road No. 4, approximately three (3) miles south of Melbourne in Brevard County, Florida, which said bridge shall be constructed according to the plans submitted by the Chairman, said plans being dated August 10, 1925, and consisting of three sheets, numbered 1, 2, 3; sheet No. 1 being Location Map; sheet No. 2 being Soundings, and sheet No. 3 being Proposed Bridge.

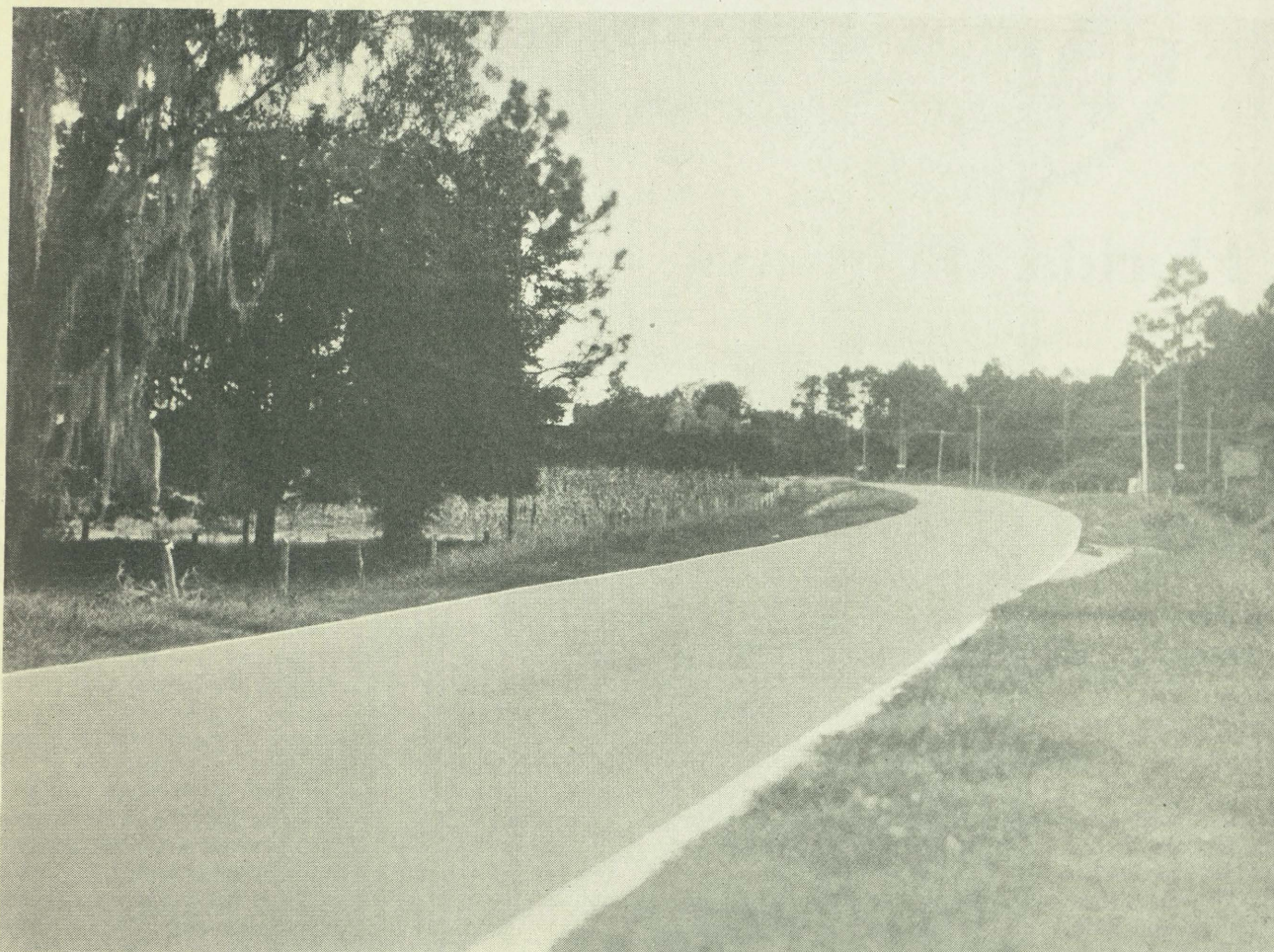
Leon-Gadsden Counties—Road 1, Project 672-B

Upon motion of Mr. Bayliss, seconded by Captain Hillman, the following resolution was adopted:

Resolved, That the Chairman be and he is hereby

The Five Million Dollar Road Program in Lake County

By W. B. Grauel, City Editor, The Leesburg Commercial.



View on State Road No. 4 (Dixie Highway) Looking Towards Leesburg (Lake County) from the North.

More than five million dollars will be invested in the building of good roads in Lake County this year. Lake County is one of the "road buildingest" counties in Florida. It is located in the lake region of Central Florida, has 1,400 lakes to be exact, leads the State in watermelon acreage, stands second in citrus production, possesses as fine a drinking water as there is in the United States, has fine cities, churches and as many sub-divisions as the next.

Five million dollars is a whole lot of money. Yet in Florida these days, unless you explain what the five million dollars is being spent for, you hardly get attention. Sums that formerly were mentioned only in bank statements, or in the school room when the teacher got up an extra hard example, are quoted daily in the newspapers of the State. You read where somebody or some town is building a 'steen million dollar what-ever-it-is. Perhaps a hotel, or a golf links, or water front improvement.

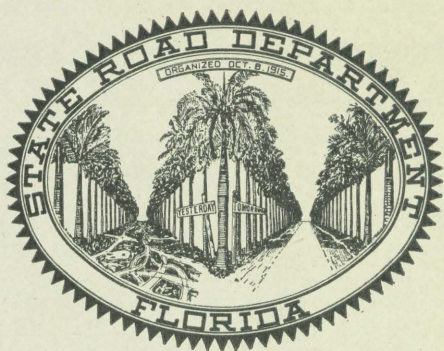
All of which helps. It's a part of Florida's progress. But where Lake County rises to great importance, where this progressive county shows the way to others, is its desire for good roads. Bond issue

after bond issue has been voted, State and Federal aid has been solicited, until the total for the year now is \$5,380,000. Ask how much your county is spending on good roads this year. It will give you some idea of what Lake County is doing. Still, Lake County is not voting these large sums for fame, publicity. Lake County BELIEVES in good roads and it is merely spending the money necessary to have them.

Lake County, from one end to the other, will soon be a delight to the thousands of persons who will use and do use its roads. There will be no part of Lake County without good roads, each section connected with a highway that will make the riding of it a pleasure. It is not to be taken that Lake County does not have good roads. Lake County has always had some of the finest roads in the State, but there have been parts of the county depending on clay or whatever the people could afford at that time. It has only been recently that State aid was secured.

Early in June road matters in Lake County got

(Continued on Page 6.)



Florida Highways

Published Monthly
Official Publication of the State Road Department

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F. A. HATHAWAY, *Chairman*
W. J. HILLMAN J. HARVEY BAYLISS
E. P. GREEN I. E. SCHILLING
ELLA CREARY THOMPSON, *Secretary*

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Jewell Smith Jones.....Bookkeeper
W. A. Williams.....Bookkeeper

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B. A. Meginniss, Attorney for the Department,
Editor and Business Manager

Volume II September, 1925 Number 10



"THE RESPONSIBLE CONTRACTOR"

On another page of this issue we are carrying an article under the above caption which is a reprint from the original appearing in the Highway Engineer & Contractor. This article has peculiar interest for those interested in road construction in Florida at this time for several reasons.

On the next page under the Chairman's Column, we present the views of that official on the attitude of the Department toward contractors. So much misunderstanding had apparently been created by the recent discussion of delayed contracts, that we deemed it wise to ask the Chairman express clearly and concisely in his own language, the actual attitude of the Department.

The article referred to above and which appeared under the caption of this editorial is an outline of the conclusions reached at a recent conference between all interested factors as to the letting of public contracts to the "lowest responsible bidder." This term is one which has been variously interpreted, but the result of the discussions was the conclusion that its meaning is implied in the words themselves, namely, not necessarily simply the lowest bidder but the lowest *responsible* bidder, by no means the same in many, many cases. For, the determination of who is the lowest "responsible" bidder involves considerations far outside the ability of the bidder to furnish the necessary bond. The experience of the contractor, his equipment, his financial ability and his record of past performance as well as his integrity are considerations which must inevitably enter into a determination of his "responsibility".

The interesting feature of the article in question is that the result of the conference was a determination that a questionnaire furnished by the contractor should be required in every instance, and that Florida has recently adopted this exact method in dealing with prospective road contractors. The questionnaire which has been prepared by the Department is exhaustive and is designed to draw out the salient facts as to a contractor's experience, his integrity, the contracts which he has at the time of bidding, his record of past performance, a detailed financial statement, the equipment which he has available for the work, and his financial connections. It is believed that this question sheet will readily develop the information sought, and will minimize the chance of award to an irresponsible contractor.

Defaulted contracts, it is gratifying to observe, have been the exception rather than the rule in Florida, but the few which have been inescapable have demonstrated how expensive a defaulted contract can be in the matter of delay, loss of time and additional inconvenience. The questionnaire likewise will shed light on a contractor's ability to finish his work on time, and will accordingly reduce to a minimum the delays which hitherto have often hampered the road construction programme in Florida.

CHAIRMAN'S COLUMN

**ATTITUDE OF THE STATE ROAD DEPARTMENT TOWARDS ITS CONTRACTORS**

The State Road Department will insist that the terms of its contracts be faithfully observed and not considered as mere scraps of paper. The Department will scrupulously keep its covenant with the contractor, allowance being made at all times for the unavoidable delays; dilatoriness and unnecessary delay will not be tolerated. That the unavoidable may be detected, it will be the policy of the Chairman to require the Department Engineers to keep him advised weekly of the progress of the work in the contractors in his division, the Chairman himself visiting the scene of operations as frequently as the duties of his office will permit.

In this connection, it will be well to state that the Department will co-operate fully with the contractor, lending him every assistance possible to facilitate

his work. In other words, the Department desires to be of assistance to a contractor and does not wish to hamper him in any way in the prosecution of his contract. This was shown in the calling of the conference on August 17th in Jacksonville, when the producers of lime rock, the contractors and representatives of the railways took their places around the table to discuss the situation affecting road construction in Florida. A spirit of co-operation was early manifested at this conference and as a result a better understanding was had. Tangible results have already followed; the Florida East Coast Railway, the only one represented on which an embargo against rock shipments had been declared, has since lifted the embargo, and the contractors on that road are getting their rock. There was no embargo on the other roads represented, but a shortage of cars existed. The representatives of these roads assured the

(Continued on Page 20.)

THE FIVE MILLION DOLLAR ROAD PROGRAM IN LAKE COUNTY

(Continued from Page 3)

going on the present progressive basis, when bond issues were validated for the construction of new highways and a new bridge at Astor, together with reconstruction along strictly modern, up-to-date methods of many miles of old roads which have been outgrown in the flood of incoming motor traffic. Four new districts were formed, Nos. 7, 8, 9 and 10.

District No. 7, which includes the territory around Groveland in the south end of Lake County, voted \$750,000, bringing about the early completion of State Road No. 22, which runs from the Orange County line at Oakland via Minneola and Clermont, and thence through Groveland and Mascotte to the Sumter County line and from there to the West Coast.

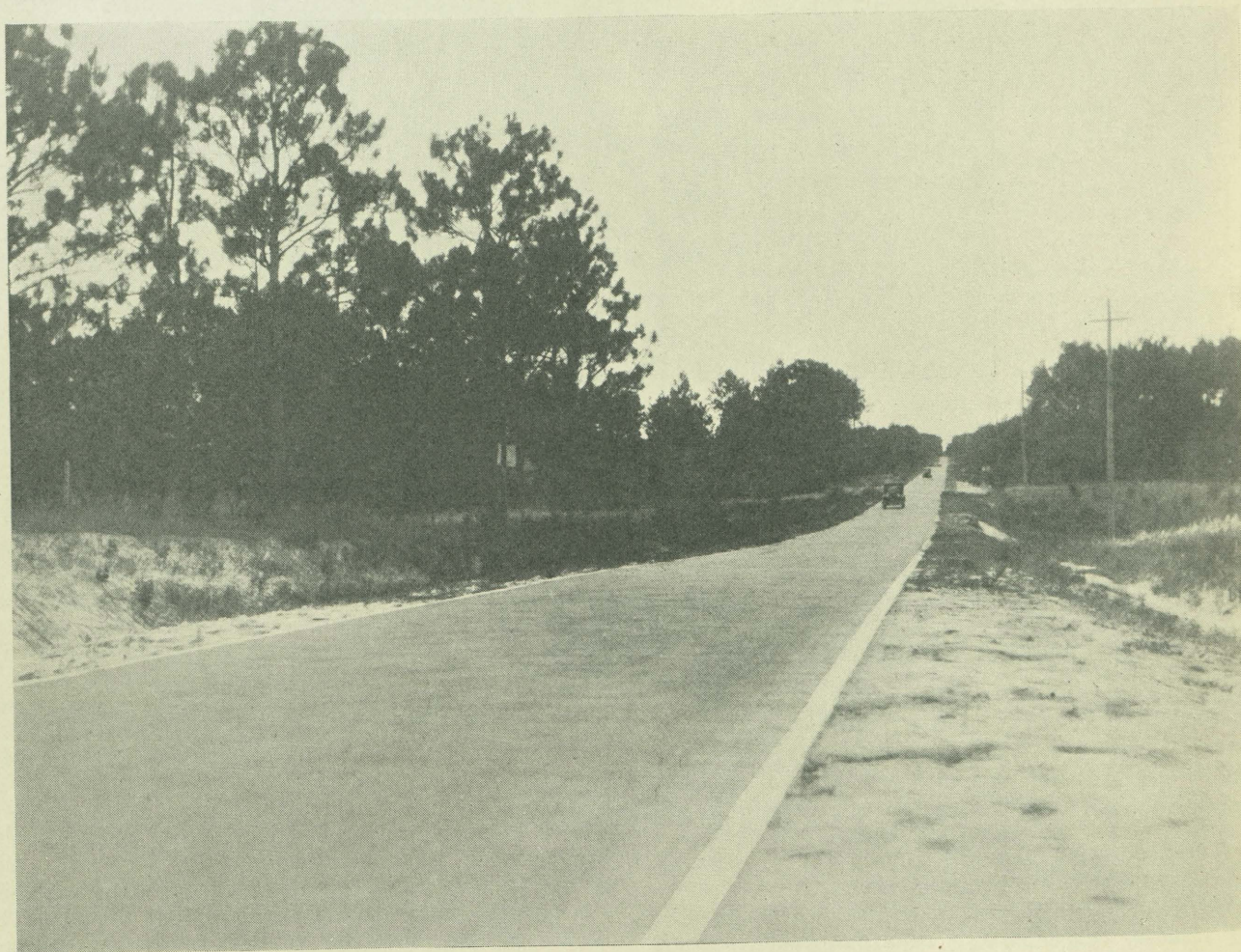
District No. 8 provided \$985,000 for roads as follows: From Dead River Bridge on the Leesburg-Tavares road, to Tavares and Mount Dora; from Howey road to Montverde and Ferndale, and the construction of a causeway and draw bridge across Lake Harris from Astatula to Howey, linking Howey to central Lake County by a much shorter route than formerly.

District No. 9 will expend the sum of \$900,000 for the complete rebuilding of the highway between Astor, on the shore of the St. Johns river at the southern approach to the new bridge to be constructed there, to the Polk County line at the extreme southern end of the county. It is expected that this route will be designated as a State road and added to the State road map, and considered a part of the official State Highway system. This route will cut the distance between Jacksonville and Tampa, the two largest cities in the State, by about 30 miles, as well as providing visitors with a greater opportunity of seeing the scenic beauties of the Lake Region than by any other route.

This district will also attend to the building of the new bridge at Astor, for which the additional sum of \$150,000.00 has been provided. This will be a toll bridge for the first year or two as it was impossible to obtain the consent of Volusia County to a free bridge, but it will be made such at the earliest opportunity.

District No. 10 will include the roads running from Mount Dora to the Wekiva river on the way to Sanford; from a point close to Eustis to the road running between Sorrento and Messina on the way to

(Continued on Page 20.)



Another View on State Road No. 2 (Dixie Highway) Looking Towards Leesburg (Lake County) from the North



Another View on State Road No. 2—Lake County

The World's Most Remarkable Highway

There is a highway in this country which experts declare to be the most interesting and the most attractive, unmatched in any respect in all the world. It is from 400 to 500 feet wide and about 22 miles long in an unbroken stretch. It is almost as smooth as a floor. It is so resilient that the comfort of riding is as great as it would be over a motor road of solid rubber. It never cost a dollar for construction or maintenance. Twice every day nature irons it out and sweeps away all trash that may have accumulated from the thousands of people who frequent it. It could not be duplicated by all the wealth of the world. It is the handiwork of the Almighty and men can never find a way in which to match it.

This highway is the celebrated Daytona-Ormond beach in Florida, which stretches along the Atlantic Ocean without a break for about 88 miles. At low tide it is 400 to 500 feet wide. It is as hard as a solid road of rubber. A hundred motor trucks of the heaviest tonnage could run over it continually, day

after day, without in the slightest injuring it. The heaviest automobile running at full speed makes no impression upon it except where it has caused a little drying out of the sand.

There is no other beach, so far as can be learned, that is at all comparable to it. There are several beaches of a similar character in Florida, but they are much shorter. This beach is one of the handiworks of nature which makes everyone who sees it for the first time marvel at its beauty, at its solidity, at the comfort in the automobile that rushes over it. Once in a while a great storm will make it just a little rough in places, but the next floodtide irons it out as smoothly as before. When the tide is low a dozen automobiles could be driven side by side without danger.

As the Atlantic Ocean in all the majestic beauty of its rolling billows breaks along this beach, the view is one which must impress every reverent heart with a profound sense of the power of the Creator and the littleness of man. Along this beach, through winter and summer, thousands flock for surf-bathing.—Manufacturers' Record.

The Responsible Contractor

For many years the irresponsible contractor has been the bane of the construction industry, and any movement which tends to eliminate him deserves support.

A report of value was recently presented to, and approved and recommended by the Joint Conference on Construction Practices. The committee presenting the report consisted of: Chairman S. M. Williams, vice-president, Autocar Co., Ardmore, Pa.; W. H. Connell, deputy secretary of highways and engineering executive, Harrisburg, Pa.; L. A. Boulay, director of highways and public works, Columbus, O.; I. P. Jones, secretary, State highway department, Dover, Del.; Morris Knowles, president; Morris Knowles, Inc., consulting engineers, Philadelphia, representing the American Institute of Consulting Engineers; F. L. Canford, general contractor, Brooklyn, N. Y., representing the Associated General Contractors of America; W. P. Christie, engineer, also representing the A. G. C.; J. S. Langthorn, president Langthorn & Smith, engineers and contractors, New York, representing American Society of Civil Engineers; Keith Compton, director of public works, Richmond, Va., representing American Society of Municipal Improvements. Mr. Williams represented the Highway Industries Exhibitors Association.

Following are extracts from the report of the committee:

For some years public officials have been faced with growing conditions in the construction industry which have not only been annoying, but frequently resulting in detriment to communities.

Study of the problem has shown a tremendous increase in irresponsibility and inexperience in the construction industry.

Public officials are realizing that defaults add to construction cost; that delays in completion of contracts due to such defaults deprive communities of the economic use of the improvements and frequently result in heavy losses.

The annual expenditure in general construction throughout the United States is approximately \$6,000,000,000, of which approximately \$2,000,000,000 is for highway construction and maintenance. The interest of the public demands, in that expenditure, the greatest economy consistent with efficiency.

Two Important Points

Investigation as to some of the causes for the present uneconomic conditions in construction has developed—

First, a custom more or less cumbrous throughout the country, due to the interpretation of a somewhat general law governing the award of contracts for public work, which provides that the contract shall be awarded to the lowest responsible bidder. This determination of responsibility has in many communities been limited to the ability of the contractor to purchase a bond with little, if any, consideration as to his ability to perform the contract.

Second, competition between surety companies has been very keen with the result that many bonds have

been written which did not insure responsibility or experience.

In some states public officials are recognizing their obligation of definitely determining the responsibility and experience of the bidder.

Increasing Use of Questionnaires

The Illinois Division of Highways, on Mar. 2, 1924, announced a new policy involving the filing of questionnaires on finance, experience and equipment by contractors bidding upon their work. On March 2, 1925, almost one year later, Frank T. Sheets, chief highway engineer of Illinois, advised Chairman Williams in response to his request as to the value from the use of uniform questionnaires similar to that used by his department, as follows:

"It is our belief that the adoption of this questionnaire has been of great benefit to us in carrying out our work. We believe that all other highway departments could derive a great deal of good by adopting some form of questionnaire. By using this document we are able to obtain a considerable amount of information concerning the work which each contractor has performed in the past, the amount of equipment which he has on hand to perform the work in question and reliable references to whom we can write for further information.

"We believe that the adoption of some form of questionnaire would be of great benefit to the construction industry in general.

"The general public benefits by the use of the questionnaire in an indirect way, because we are enabled to pick out the more responsible contractors, thereby insuring the completion of the work within the time limits."

In response to an appeal from L. A. Boulay, director of public works and highways, the attorney general of Ohio ruled early last year that it was the duty of the public official to award contracts to the "lowest and best bidders" and that the word "best" must take into consideration all of the qualifications of the bidder. After consideration of the most effective procedure Mr. Boulay, upon behalf of his department, adopted a policy similar to that of Illinois, involving the use of questionnaires.

Georgia and Virginia report the adoption of policies for determining responsibility and experience similar to those used by Illinois and Ohio.

Wisconsin reported a policy of classifying its contractors according to their responsibility and experience, and holding the award of contracts within those classifications.

From the Tennessee Department of Highways and Public Works was received a copy of a "Special Notice to Bidders" dated April 8, 1925, which read as follows:

"Bidders are hereby notified that in the future the department intends to carefully investigate the fitness of the low bidder to do the work in a thoroughly satisfactory manner and within the time indicated. Previous experience, organization, work



Another Section of State Road No. 2—Lake County

Contracts Awarded by State Road Department, Jan. 1 to Sept. 12, 1925

Contractor	Proj. No.	County	Roads	Bridges	Contract Plus 10%	Type
			Length Miles	Length Feet		
Atlantic Bridge Co.....	33-B	Escambia .....	....	1570	\$ 289,113.77	Conc. & Steel
R. H. H. Blackwell.....	45	Madison .....	....	910	124,902.27	Conc. & Steel
Langston Const. Co.....	534	Brevard	7.69	....	177,361.80	Rock Base
B. Booth & Co.....	46	Nassau	11.52	....	95,664.77	Grading
Pensacola Shipbuilding Co.	421	Nassau .....	....	560	233,094.18	Steel & Conc.
Luten Bridge Co.....	46	Nassau .....	....	....	52,150.60	Drain. Struct.
Luten Bridge Co.....	581	Hillsborough .....	....	....	75,837.26	Drain. Struct.
Barnes & Smith.....	581	Hillsborough	12.10	....	240,237.78	Rock Base
Boone & Wester.....	47	St. Johns	14.96	....	142,934.86	C. G. G. & D. S.
Otis Hardin	647	Highlands	4.00	....	16,720.00	Grade
Whitney Const. Co.....	607-B	Clay	6.68	....	89,200.32	Rock Base
Taylor & Cox.....	617	Alachua	5.17	....	23,656.66	Grade & Drain.
J. R. & J. B. Miller.....	618	Alachua	10.89	....	49,163.26	Grade & Drain
L. M. Gray.....	628	Volusia	9.92	....	152,099.00	Rock Base
H. E. Wolfe.....	629	Highlands	6.00)	....	156,113.44	Rock Base.
H. E. Wolfe.....	647	Highlands	7.00)	....	16,170.00	Embankment
S. G. Collins.....	638	Santa Rosa .....	.34	....	170,834.20	Sheet Asph.
Sou. Paving Const. Co....	661	Lake	3.52	....	61,077.46	C. G., G.
Taylor Contracting Co....	633	Gadsden	9.67	....	37,984.17	C. G., G.
Taylor Contracting Co....	639	Gadsden	9.83	....	66,840.94	C. G., G. & D. S.
B. Booth & Co.....	642	Putnam	10.82	....	42,351.28	Sand Clay
Penton-Mathis Const. Co..	649	Okaloosa	10.43	....	55,278.01	Sand Clay
Penton-Mathis Const. Co..	652	Okaloosa	9.04	....	229,961.64	Sheet Asphalt
Broadbent Const. Co.....	613	Sarasota	4.62	....	28,382.46	C. G. G. & D. S.
J. L. Hunter.....	595	Volusia	7.43	....	39,767.20	C. G. G.
Gillis Construction Co....	586	Jackson-Wash'ton ..	7.47	....	3,509.00	Underpass
Ed Pettus	625	Citrus .....	....	.94	263,617.64	Rock Base
M. C. Winterburn, Inc.....	669-B	Dade	10.30	....	
Total			179.40	3,134	\$2,896,946.51	

Romance of the Road

By ERNEST McGAFFEY

Since the time that Adam and Eve were turned out of the Garden of Eden on account of the former's pusillanimous conduct in not taking the blame in the apple incident, the question of roads and highways has been probably the most important one confronting the human kind. The trail from the entrance of the Garden of Eden was a very rocky and dusty one, as our first progenitors found, for in those days sprinkling carts and steam rollers were exceedingly scarce.

Trail making and road making were common among the very earliest peoples, whether civilized or uncivilized. In the almost impassable jungles of Africa the natives cut and tore their way through thickets of bamboo and dense forests and established connections between different points. Even the animals of the "Great Outdoors," whether in Africa or in America, trampled out trails to watering places which were used by thousands and tens of thousands of the four-footed tribes. The curving of some of the streets in Boston, commonly known as the "Hub of

the Universe," was popularly supposed to have been caused by building along the cow paths made by the cattle coming and going from the pastures where they fed.

The turnpikes laid by the United States throughout some of the mid-western States became popular as trunk roads, where the farmers would come in from the neighboring country over the dirt roads, and breathe a sigh of relief when they arrived at the turnpikes, which were broad and of infinitely more permanent character than anything else in the surrounding country.

The Romans gave the world perhaps the most enduring lesson in regard to what might be called permanent highways. Their methods could not be followed in these days on account of the enormous amount of mileage that is necessary for modern highways and the prohibitive cost which would be entailed by attempting to build roads according to their

(Continued on Page 17)



Road No. 2, Marion County, Lake Weir in the Distance.

THE RESPONSIBLE CONTRACTOR

(Continued from Page 8.)

now under contract by the bidder and the financial resources of the bidder will all be carefully considered before deciding and the department reserves the right to reject the low bid if the low bidder does not measure up to the department standard in those respects."

The chairman of Maryland State Roads Commission advised it has had but few defaulting contracts, and believes it is somewhat contributed to by the fact that the commission assumes the responsibility placed upon it by the legislature in determining the responsibility of the contractor.

The Uniform Questionnaire

After careful consideration of the various subjects brought before the conference, it was unanimous in recommendation through resolutions "that both public and private owners adopt a comprehensive uniform questionnaire covering skill, integrity and responsibility that will be submitted by all contractors bidding upon construction work." It was the consensus of the conference that the questionnaire should be divided into four parts:

First, financial statement; second, experience and character; third, equipment to be used on the specific project; fourth, general plan of operation.

The Committee's Recommendations

After careful consideration as to the most effective method of using the proposed forms, the committee adopted the following resolutions:

"It is recommended that the financial statement, when completed, be approved by the conference, as a document for use where necessary and desirable to investigate a contractor's financial standing in detail and further that surety companies, banks and public officials in making their investigations be guided by this statement in whole or in part as conditions and circumstances might warrant and that where investigations are to be made, the forms and procedure, comply with the standards in form sequence and wording.

"It is recommended that public officials, in calling for proposals should indicate on the proposal form the percentage or ratio of liquid assets to the total amount of the contract, which the bidder must have available for the specific contract in order to qualify as responsible, and that financial statements be required from not more than the three lowest bidders. It is further recommended that the questionnaire and financial statement blanks accompany proposal blanks, with notice that the three low bidders will be required to fill out the forms."

Descriptions of Forms

The forms consist of a financial statement, which indicates the bidder's financial standing, and experience questionnaire designed to reveal his past record, and a plan and equipment questionnaire giving certain information with respect to his qualifications for undertaking a specific project. Each of these forms is accompanied by an affidavit, so that information presented in them is given under oath. The material in the questionnaires and financial

statement has been drawn largely from forms already in use and has been subjected to careful criticism by engineers, architects, contractors, surety officials, manufacturers and bankers.

Some division of opinion exists with respect to the practice of using such forms, as for example, whether the financial statement should be required from every bidder with his proposal or from the three low bidders only, but the conference is unanimous in the belief that the complete forms should accompany the instructions to the bidders with definite notice of the procedure to be followed.

Among the significant benefits to be derived from the standard forms are: the ease with which reliable information can be exchanged by public officials; and the saving of time and expense to construction companies who bid on the work of many different departments. Uniformity in financial statements is considered especially important, not only because of the economy factor but also because of its influence in encouraging uniform and adequate accounting among construction companies.

The forms are unqualifiedly recommended by the joint conference for use in connection with the award of either public or private contracts and it urges that they be given an immediate and thorough test. Any modifications shown by experience to be advisable can then be made.

The advisory board of the Associated General Contractors of America states that the responsible contractor whether an individual, firm or corporation must possess as a minimum of requirement three essential qualifications as follows:

Integrity—He must consistently and persistently comply with the spirit as well as the letter of his contracts. He must have business experience and handle every transaction with fairness and honor.

Skill—He must possess the necessary technical knowledge and practical experience, as applied to his particular form or group of undertakings, to enable him to carry them to completion in a workmanlike and economical manner.

Responsibility—He must also possess cash or credit to meet all his commitments, also the equipment and organization for the satisfactory performance and completion of his undertakings.

In special cases problems may appear which will demand that consideration be given to other qualifications, but in general the preceding requirements apply to all construction contracts and without them no contractor can properly be regarded as wholly responsible.

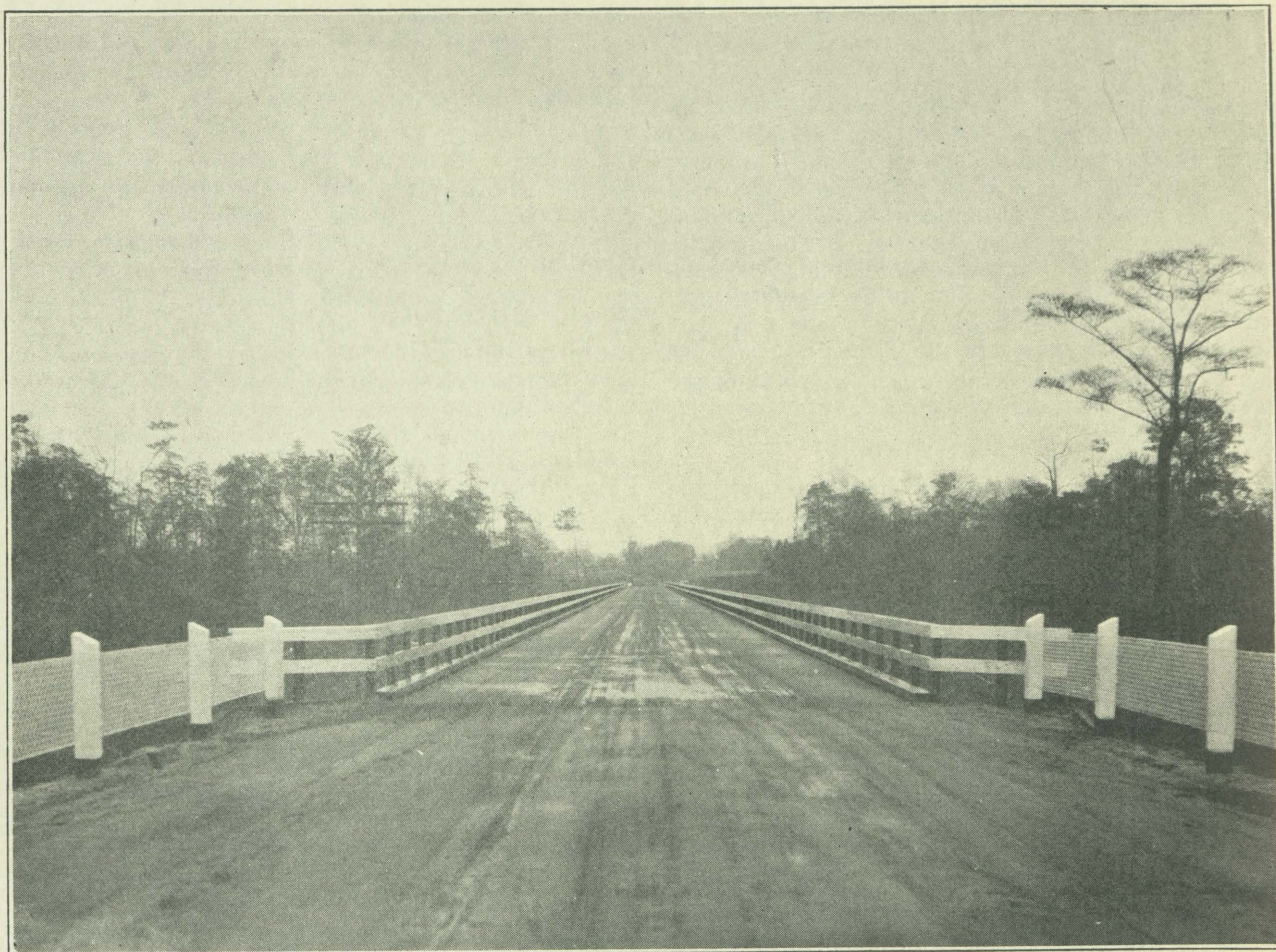
A policy working toward stabilization of the construction industry may be expressed as follows:

Public Officials! Don't let a contract unless you know that the successful bidder has the resources to complete it. Don't let a contract at a price below an intelligent estimate of cost plus a reasonable profit.

Surety Companies! Don't bond a contractor unless you know he has the experience, financial resources and the physical equipment necessary to fulfill the contract.

Equipment and Material Manufacturers! Don't sell to irresponsible contractors, and take precau-

(Continued on Page 20)



Project 579, Road No. 1, Holmes County. Creosoted Bridge over Sandy Creek.

What Good Roads Mean to the Farmer

They Mean Increased Land Values, Cheaper Means of Getting Crops to Market, Wider and Better Markets, and the Ability to Get to Those Markets Quickly Whenever Prices Are Advantageous.
These Facts Were Gathered by the United States Department of Agriculture.

A billion dollars is being spent annually in the United States in the construction and maintenance of roads. Though practically every one is benefited in some degree, the expenditure of this vast sum for highway improvement means more to the farmers than to any other one class. To them it means not only a vast increase in the value of their lands, but also getting their products to market much more cheaply and quickly. Furthermore it has given them wider and better markets. And when the vastness of the value of American farm crops is taken into consideration, quicker, cheaper transportation and better markets assume a real significance. For 1925 the gross income from agriculture, according to the United States Department of Agriculture, will be approximately \$12,000,000,000.

The many thousands of miles of good roads that have been built during the past few years assures the bringing to market of a large portion of this crop at a greatly reduced figure over what would have been possible a few years ago. This is true

regardless of whether the hauling is done by horse drawn or automotive vehicles. Motor trucks, however, are carrying an ever increasing proportion of these crops as brought out by various surveys made by the Department of Agriculture.

A good example is the transportation of hogs into the Indianapolis livestock market, as reported by that department. In 1923 nearly one-third of the receipts of hogs at Indianapolis were delivered by highway, compared with less than 5 per cent in 1913. No fewer than 934,960 hogs were delivered by truck in Indianapolis in 1923. Within a 50-mile radius of Indianapolis, 95 per cent of the hogs marketed are delivered by motor truck. There are scattering shipments from territory 75 to 100 miles away.

It was common, before the day of good roads and the motor truck, for many hog raisers who marketed 20 or 30 head to sell their stock to a local buyer. This buyer assembled hogs in carload lots and traded on a wide margin. As he could not know when he would move his newly acquired stock, he

generally paid 75 cents to \$1.25 below the market price. He also required the farmer to deliver his hogs at a point chosen for assembling a carload.

This method with its obvious disadvantages to the farmer has been entirely changed by the motor truck. The local hog buyer has been eliminated within the trucking radius of Indianapolis. Farmers are now able by watching market prices to take advantage of favorable price changes.

Studies of highway transportation made by the department in Cincinnati, Detroit, Indianapolis, Milwaukee, St. Paul, and Minneapolis, showed that in all of these markets, approximately 90 per cent or more of the milk received is transported by motor truck.

In this connection Henry R. Trumbower, economist of the United States Bureau of Public Roads, says, "Through the use of motor trucks operating over improved highways the dairy industry is promoted and developed in regions which hitherto were too far removed from railroads to be developed practically as producing areas for fluid milk destined for the city market." This has been brought about entirely by good roads.

Motor truck rates usually conform closely to those charged by railroads. In comparing motor truck rates with railroad rates, however, the department points out that the motor truck rates include pick-up service in many cases, and in all cases include de-

livery service at the city plant. Rail shipments of milk have to be hauled by farmers to country railway stations, and by dairy or city milk dealers from railroad terminals to milk distributing plants. But even here there is a big saving when hauling over good roads as compared with the unimproved.

Many other farm products are efficiently handled by motor truck, notably perishable fruit and vegetables. In fact, many small towns where formerly such products were unobtainable now furnish a market for them because they can be kept supplied regularly by trucks. In answer to a questionnaire sent out by the Department of Agriculture, farmers replied that it takes less than half the time to haul to market by truck, over good roads, than it formerly required when using horses over poor roads. Thus the cost of hauling is greatly decreased and much time is saved for productive work on the farm.—The Highway Magazine.

Bare Facts

A speaker at a minister's meeting in Boston told the story of a negro clergyman who so pestered his bishop with appeals for help that it became necessary to tell him that he must not send any more appeals. His next communication was as follows:

"This is not an appeal—it is a report. I have no pants."—Texas Highway Bulletin.



Project 634, Road No. 1, Jackson County.

Highway Research

By A. N. JOHNSON, Chairman, Highway Research Board,
of the National Research Council.

Before going into details as to highway research, we may take a moment to consider research generally. Research, we are informed by the dictionary, is "the careful or critical inquiry or examination in seeking facts or principles."

The work of the researcher is essentially different from that of the practicing engineer. The engineer plans definitely for a specific purpose or end. The facts and conditions are assembled and known; then the means are devised for executing the work to be done. Not so with the researcher. While sometimes he may have a desired end to attain, often there are no facts or definitely known conditions at hand. There is no precedent from previous experience to guide him. No evidence or fact is too trivial to escape his notice. He may not be at all sure that the plan of investigation upon which he embarks will arrive at a definite port. Again, he may be wholly unaware of the significance or the application of the facts that he has brought to light, but, because of his research, someone, at some time, will make the discovery that these facts are of vital concern to mankind.

Research of this character can be best illustrated by an incident in connection with the work of the German chemist, Nageli, who lived about one hundred years ago. He was studying the reproduction of cells, and for this purpose used a form of algae. He desired to cultivate them in his laboratory which he had improvised in his kitchen. This he was unable to do. The algae, as soon as placed in the water in the laboratory, died for some unexplained reason. After careful observation, he noted that all the algae placed in water drawn from a copper spigot died. Others placed in water not drawn through the spigot lived. He concluded that the minute amount of copper contained in the water caused the death of the algae. Further experiment proved this to be true; and that so small a portion as one part in 50 millions was sufficient to destroy the algae life. But it was not until nearly 75 years later that sanitary engineers made use of this knowledge in the purification of water supplies. It was further discovered that the copper which killed the algae also killed many harmful forms of bacillus life. Thus, upon the observations recorded by the German chemist 75 years previous, the health of city dwellers, the world over, was protected.

I bring this illustration to emphasize the fact that research work is, of necessity, done on a different basis than the engineering work with which you and I are most familiar.

The value of research work in modern commercial life is evidenced by the fact that so many of the great industries have many millions of dollars invested and spend many thousands yearly in the maintenance of elaborately equipped laboratories in charge of scientists of the widest reputations, to seek facts, to discover new methods or processes, by investigating patiently a thousand different methods in order to arrive at one which may prove practical in commercial

and every-day activities. So, too, in the great industry of highway transportation, there is equal need and equal value for research.

Seldom has there been experienced in so short a time such a great economic development as we have witnessed in highway transportation. This development has brought into existence thousands of miles of improved highways and millions of vehicles, totaling an annual expenditure of such huge sums that they almost lose meaning for want of a comparison by which they may be measured. For the construction of roads alone, we are spending over a billion dollars a year and several more billions for the manufacture, upkeep and operation of the vehicles. It is not hard to conceive that this should raise a wide variety of problems that call for a great diversity of talent for their study and solution, problems for the economist and the engineer, the physicist and the politician.

The State Highway Departments found themselves suddenly called upon to expend millions, where thousands had sufficed. Heavy loads at high speeds had to be carried. Experimental work was undertaken.

In the effort to help to co-ordinate not only investigations that had been undertaken, but to outline the field that was opening for research in the development of highway transportation, the Highway Research Board of the National Research Council was organized, of which Mr. Charles M. Upham is director. Through its effort, there has been fostered increasing active participation by the state universities, where, naturally, much of the work of this character could best be done, provided there was some way to find out what should be done and who could do it.

It is not easy to point, at this early date, specifically to the economic saving that may have been so far effected by these highway researches.

A carefully compiled list of these projects has been made by the Highway Research Board, totaling in number 479, divided as follows:

State highway investigations	205
University investigations	184
Municipal, county, industrial	90

It is a part of the work of the Highway Research Board to put this mass of information, resulting from these researches, in such form as will impress the public with the material value and necessity of work of this character in the highway field. The fact that, at present, we do not know the exact money value that can be named as the result of these particular researches is not particularly significant. But what is of significance is that there have been programs of research inaugurated in many states that cover a wide field.

Foremost among these are the investigations that have been carried on by the U. S. Bureau of Public Roads, many of which have been in co-operation with the state highway departments. The bureau's inves-

tigations into subgrade conditions, that may be considered as fundamental in the design of our highways, have gone already far enough to point out clearly certain forms of construction that should be followed, and that others on which much had been expended in the past were of small value.

A very interesting economic study has been made in Wisconsin under the direction of the State Highway Department, where it has been learned that tourists in Wisconsin spend yearly, within the state, 80 million dollars, the profit on this amount of business being much more than the state spends on its road system.

As illustrative of the extent to which some of the states have undertaken highway research problems, may be cited what is known as the Bates Test Road in Illinois. This project was carried out by the State Highway Department of Illinois, of which Mr. Clifford Older was chief engineer, in co-operation with the U. S. Bureau of Public Roads, of which Mr. T. H. MacDonald is chief. The state expended on this experiment \$250,000, a large sum for building purely a test structure. One outcome of these tests was a modification of the cross section for concrete roads in the state, lessening the amount of concrete used, while strengthening the road slabs to carry traffic; a saving on the road program, then actually in hand in Illinois, of over two million dollars. This excellent and remarkable piece of highway research work is fully described by Mr. Older in the Proceedings of the A. S. C. E. for February, 1924, page 175.

The extensive series of tests undertaken at Pittsburg, California, is another illustration of the high grade scientific work that is being done in connection with highway research. This investigation was a cooperative effort between the State Highway Commission of California, of which Mr. A. B. Fletcher was State Highway Engineer, and the U. S. Bureau of Public Roads.

For this investigation, there was constructed a track, with parallel sides and circular ends of 75 feet radius, a total distance of a little over 1136 feet, on which was concentrated in 89 days over 71.3 million tons of traffic. This amount of traffic may be better visualized by the fact that a road with an average distribution of truck traffic of 1000 trucks per day would require something over 12 years to carry the tonnage applied on the Pittsburg Test Road.

The road itself was of concrete construction of various types, special care being taken to install apparatus that made it possible to observe the effect of traffic upon the road slab. It is impossible in this running summary to do more than refer those interested to the excellent report of this research issued by the Department of Public Works of California, under the title "Report of Highway Research at Pittsburg, California, 1921-1922." It is significant that many of the phenomena, particularly the curling or vertical movement of the road slab during a change in temperature of the top and bottom of the slabs, noted in the Pittsburg Road Test, are also recorded in the observations made on the Bates Road Test and those made at Arlington, Va., by the Bureau of Public Roads.

In North Carolina, notable work has been done under the guidance of Mr. C. M. Upham, Chief Engineer of the State Highway Commission. After a careful study of what had been done elsewhere, and through building sections of road experimental in character, there has finally been developed a form of road construction suitable for considerable amount of light traffic, which has a greater potential value in the development of many of the poorer and sparsely settled sections of the State. This has been brought about through the development of an inexpensive type of road surface, taking advantage of the sandy character of the soil which prevails in much of the region traversed by these roads.

Investigation and research are needed to study how best to use the highways; what are the proper regulations. First, that we may safeguard life and limb; second, that we may expedite the flow of traffic over the highways. There is no more serious problem before us than that of highway safety. Our highway traffic accidents have reached the appalling yearly total of over 23,000 lives and more than 600,000 persons maimed and injured. We almost ask ourselves if we have not created a Frankenstein.

Probably no more perplexing problem is presented than that of traffic congestion today. We provide radial or arterial roads which concentrate such a large flow of traffic at given points, as of itself to cause stagnation through these centers. We may bring traffic readily and rapidly to the confines of a city, only to discover that there is not traffic area sufficient to take care of the volume that has been so attracted. Eventually, this must cause so great inconvenience as to reduce the amount of traffic. The problem before us is to determine, if possible, what may be the ultimate flow of this highway traffic, and the provisions that should be made for its accommodation. What may very likely happen is the essential readjustment of the distribution of population tending to disperse it rather than continue concentration, as has been the case for so many years, and witnessed by the upbuilding of our great cities.

Perhaps enough has been said to indicate the character and value of research work in general, and in particular that we have many grave and pressing problems in highway transportation that call for cooperation of every available agency. Our universities, with their splendid equipment of men and laboratories, can probably be used to greater advantage. A very important part of the work of the Highway Research Board will be to arouse the interest of the various agencies in these problems.

The Highway Research Board also has a number of researches under way which are financed by industrial concerns and there is little doubt but that the program of researches so financed will soon be much enlarged.

This may be expected because the opportunity presented for this character of cooperation, through the organization of the Highway Research Board of the National Research Council, furnishes unique auspices under which such work may be carried on that is scientific in character and impartial in its findings.

DIXIE HIGHWAY MOTORCADE ANNOUNCED FOR NEXT OCTOBER—6000-MILE TRIP

Rivalry, good-natured but keen, is marking the attitude of many cities and towns along the Dixie highway in seeking preference in arrangements of the motorcade by which will be celebrated next October, the tenth anniversary of the organization. As has been announced the great movement of automobiles from Sault Ste. Marie to Miami will be over all divisions of the 600-mile Dixie system, so that all sections and communities will be included in the tour by what is anticipated to be thousands of people.

All of the dating north of Chattanooga, Tenn., will be based on arriving there October 14. Other than the fixed stop in Chattanooga, which is and always has been headquarters of the Dixie Highway Association, the selection of places for considerable stopovers must be on the basis of what is offered in the way of special entertainment or attractions, declares Chairman Lovell.

Vice-Chairman Stacy Hill of Cincinnati says:

"The motorcade is going to be one of the biggest affairs of its kind ever held. We have already gotten acceptances from U. S. Senators Ernst and Dupont and expect the Secretary of Agriculture. Every town we visited was wildly excited when we told them of our plans and what is worrying me now is what we will do with the crowds."

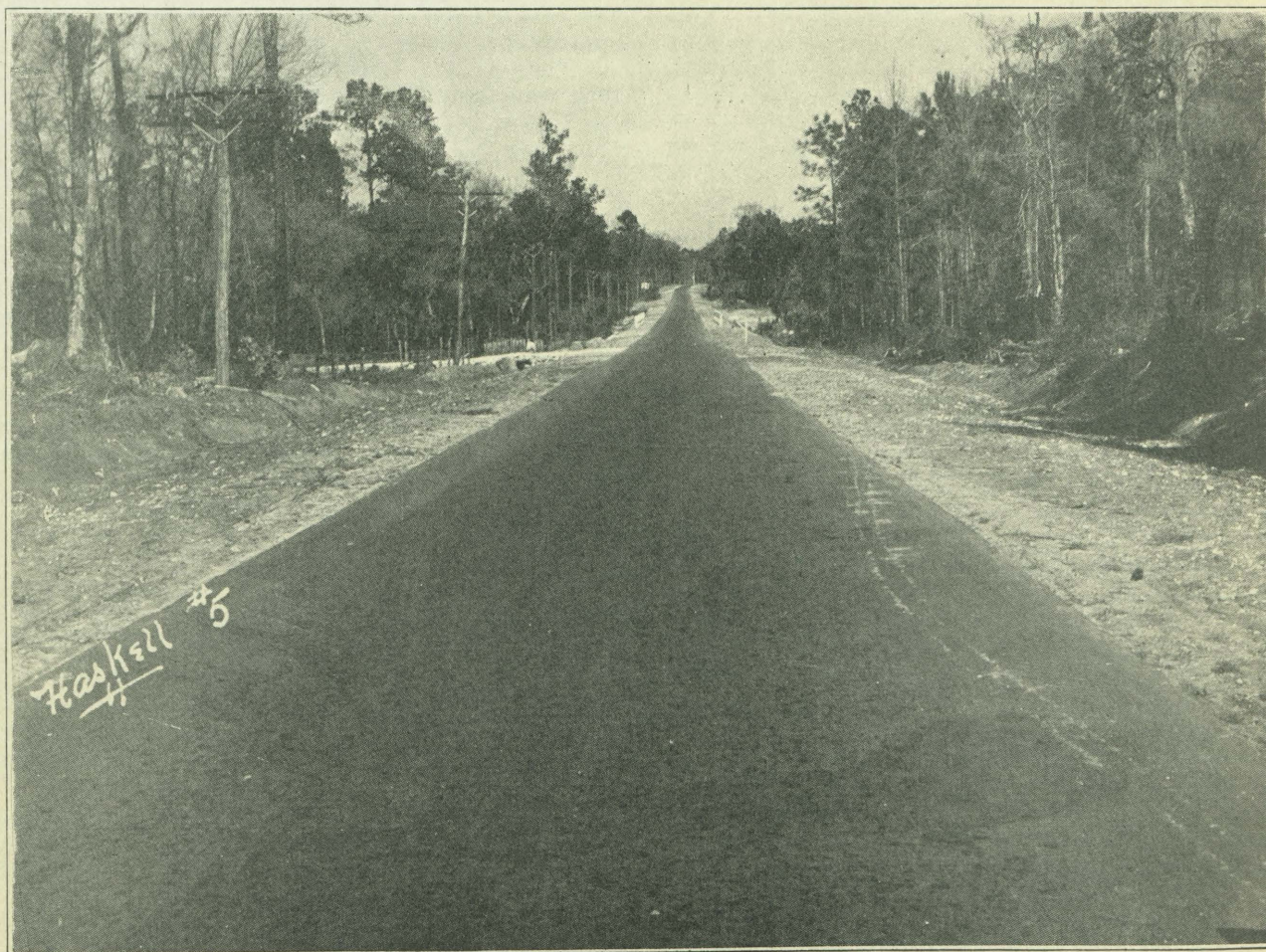
W. G. Edens, Dixie highway committeeman in Chicago, and vice-president of the Central Trust Co. of Illinois, also writes optimistically about the motorcade. He said in part:

"After consultation with Messrs. Finnegan and Paulman of the committee, and with William R. Dawes, president of the Chicago Association of Commerce, it has been decided to request the good roads committee of the Chicago Association of Commerce to handle all the details relative to our participation, the members of the Dixie highway committee co-operating with them. Two of our Dixie highway committeemen are also members of the good roads committee of the association."

The Detroit Automobile Club is another large organization which will co-operate to the limit, and devote to its success much of the time of its busy manager, W. S. Gilbreath, well known all along the highway through his former connection with the association.

The Detroit Automobile Club, writes Director William E. Metzger, in co-operation with other Michigan organizations will assist, and Mr. Gilbreath can arrange to handle the motorcade from Sault Ste. Marie, Mich., to the Ohio line, with the understanding that he will, himself, go with you, probably through to Miami, in any capacity you may determine.

In points farther south than Chattanooga as well as there and in the north much interest is being shown in the motorcade. From Macon, Atlanta and Florida cities comes the word that arrangements are under way and that the south will be well represented in at least the final lap of the trip and attend fully to her duties as host to the northern visitors.—The Highway Engineer & Contractor.



A Section of State Road No. 5.

ROMANCE OF THE ROAD

(Continued from Page 10)

plans. Some remnants of these old roads still remain in Great Britain and a thorough inspection of them reveals the fact that they were really four roads built one on top of the other. After preparing the ground thoroughly by digging until they came to hard bottom, the Romans rammed down a mass of gravel and hard sand, finishing it up with heavy rollers, and then placing upon this a covering of cement which was really what we would now call the subgrade.

The first layer which they laid on this cement was large, flat stones, cemented together, with the largest stones placed along the sides of the causeway. This layer was approximately 10 inches high and was called "statumen."

The second layer put down was stones of round or oval shape, sometimes mixed with broken tile and brick. This layer was spread over the first one and rammed down into the mortar, which cemented the layers together. This second platform was about 8 inches thick and was called "rudis."

Not satisfied with these 18 inches of practically solid masonry, the Romans laid down a third strata, consisting of 1 foot of mortar made of chalk, sand or hassock mixed with lime, which filled up all the cavities and crannies in the lower layers, and settled into a hard level coat. The third strata was called "pudding."

The fourth and final layer, which the Romans called "summa crusta," consisted of large stones cemented together, or sometimes of gravel or small flints mixed with gravel. The hardest stones of all were used in this layer as well as the largest of the flints.

When one of these roads was finally completed, it was practically a stone wall, similar to the foundation of one of our modern buildings but different from such a foundation from the fact that it contained four separate layers, each one of different character and each one a road in itself. These roads were built to "stay put," and the fact that they are still in existence after centuries proves that the followers of Caesar built both wisely and well.

Modern roads cannot boast of anything near the longevity of these four-time roadways constructed by the Romans, but there have been and are interesting examples of highways which have withstood very successfully the encroachments of time and the wear and tear of the seasons.

In July, 1873, three streets in the city of Edinburgh, Scotland, namely, Liven terrace, Glengyle terrace and Gillespie crescent were paved with concrete. For 53 years these pavements have served the traffic of Edinburgh and today are in a good state of repair.

In May, 1869, there was laid in Thread-Needle street in London an asphalt pavement with an 8-inch concrete base, and in October, 1870, another asphalt pavement was laid in Cheapside on a 9-inch concrete base.

One of the oldest roads in existence is a stone causeway west of the great Pyramid which, according to Herodotus, was built by the Egyptians over 6,000 years ago and over which blocks of stone were hauled for the construction of the pyramids.

Post roads in London, the roads built by Napoleon in France for the transportation of heavy artillery and which are now used for general transportation and commerce, are incidents in the history of the highway which are both interesting and instructive.

Few people realize the transcendent influence which highways and highway systems exercise over the welfare and progress of the country. This is especially true since the introduction of the automobile and its corollaries, the automobile truck and stage. It is not too much to say that, in the last analysis, highways control 50% of the actual transportation of the country. In the records of transcontinental travel it has been ascertained that fully 50% of this particular kind of traffic is carried on by means of automobiles, while the enormous tonnage transported by automobile trucks, both in cities and over the highways of the country in long hauls and short hauls, evidence the tremendous influence which this character of transportation exercises in commercial circles. The transportation of passengers, both by private cars and automobile stages, almost defies computation.

In transcontinental traffic five great transcontinental lines extend from the Atlantic to the Pacific coast through the principal cities and giving them a vast volume of travel from intersections over lesser thoroughfares. Two of these transcontinental lines—the Lincoln highway from Omaha to Los Angeles, and the National Old Trail route from Kansas City to Los Angeles, both of them leading from New York through to the Pacific coast—have been sign-posted by the Automobile Club of Southern California, so that travelers reaching these points have a complete directory of signs straight through from the middle of America to the Pacific coast.

One of the most comprehensive marks of the growth of highway building is afforded by the Southern States. Not only the States on the Atlantic border, but the States extending from Florida west along the southern line of the United States are expending millions of dollars annually in the extension and completion of highways, both for automobile travel and for the use of the farming and business communities.

The time is rapidly approaching when it will be possible for the motorist to start from any city along the Atlantic or Pacific coast, along the southern or northern border of America and make a complete circuit of the United States on modern paved roads which will allow a rate of travel not less than 25 and 35 miles per hour.

The "Romance of the Road" is one which enters into every conceivable walk of life—business, commerce, recreation, health, education and religion—in fact every possible condition of life is more or less bound up with the question of transportation, and transportation means highways. Engineering and highway experts and economists are finding that the truest economy as regards road-building is the preparation of the subgrade and the building for the future, rather than constructing superficially as regards subgrades and looking ahead for only a few years as regards the handling of the top surfacing.

The use of the automobile and the automobile

(Continued on Page 21.)

TRANSACTIONS OF THE DEPARTMENT

(Continued from Page 2.)

authorized and directed, without further reference to this body, to make application to the War Department for the approval of the construction of a bridge over Ocklocknee River, located on State Road No. 1 between Leon and Gadsden Counties, Florida, which said bridge shall be constructed according to the plans submitted by the Chairman, said plans being dated August 10, 1925, and consisting of three sheets, numbered 1, 2, 3; sheet No. 1 being Location Map, sheet No. 2 being Soundings, and sheet No. 3 being Proposed Bridge.

Escambia County—Road No. 7

Upon motion of Mr. Bayliss, seconded by Mr. Schilling, the following resolution was adopted:

Whereas, Road No. 7 forms a part of the Federal Seven Per Cent System of Florida; and

Whereas, the State Road Department is desirous of obtaining Federal funds to aid in the construction of that portion of Road No. 7 from the end of the concrete pavement north of Pensacola to a point approximately 6.5 miles north, in Escambia County; now therefore,

Be it resolved, That the Chairman is hereby authorized to submit plans and specifications to the Bureau of Public Roads, and make application for Federal aid for said project; and the Department does hereby pledge that necessary funds will be provided by said Department for meeting Federal aid on said proposed Federal aid project; and be it further

Resolved, That the State Highway Engineer be and he is hereby directed to commence the construction of said road as soon as all necessary plans are completed.

Escambia County—Road No. 1

Upon motion of Mr. Bayliss, seconded by Mr. Schilling, the following resolution was adopted:

Whereas, Road No. 1 forms a part of the Federal Seven Per Cent System of Florida; and

Whereas, the State Road Department is desirous of obtaining Federal funds to aid in the construction of that portion of Road No. 1 from the west end of the Escambia Bay bridge to Pensacola; now, therefore, be it

Resolved, That the Chairman is hereby authorized to submit plans and specifications to the Bureau of Public Roads, and make application for Federal aid for said project; and the Department does hereby pledge that necessary funds will be provided by said Department for meeting Federal aid on said proposed Federal Aid Project; and be it further

Resolved, That the State Highway Engineer be and he is hereby directed to commence the construction of said road as soon as all necessary plans are completed.

Road No. 1—Leon and Gadsden Counties

Upon motion of Captain Hillman, seconded by Mr. Bayliss, the following resolution was adopted:

Be it resolved, That the Chairman and Mr. Bayliss, member of the Department from the Third Congressional District, be and they are hereby authorized to definitely locate the routing of State Road No. 1 between Tallahassee and Quincy.

War Department Permits

Upon motion of Mr. Schilling, seconded by Mr. Bayliss, the following resolution was adopted:

Whereas, This Department in its construction of State roads frequently finds it necessary to cross navigable rivers and streams under the jurisdiction of the War Department, and

Whereas, It is necessary in each instance before construction of the necessary bridge thereover can be made that permit therefor be secured from said War Department, and

Whereas, the delay incident to securing formal resolution of the Department authorizing the same in each instance is, in the judgment of the members of this Department, one that can be obviated by lodging with the Chairman power to make applications for said permits in the name of the Department;

Now, therefore, be it resolved, By the State Road Department of the State of Florida, that in each and every instance where it shall hereafter become necessary in the construction of any State road to cross or bridge any navigable stream in the State of Florida under the jurisdiction of the United States War Department, that the Chairman be and he is hereby authorized, without further reference to this body, to make application for the necessary permit covering such construction and in connection therewith to submit all necessary data and plans required by the said Department in the granting thereof.

Orange County—Road No. 3

Upon motion of Capt. Hillman, seconded by Mr. Bayliss, the following resolution was adopted::

Be it resolved, That the Chairman be and he is hereby authorized to enter into an agreement with the city of Maitland to co-operate with said municipality in the construction of State Road No. 3 as a paved street or highway through said town.

Car for Chairman

Upon motion of Capt. Hillman, seconded by Mr. Schilling, the following resolution was adopted:

Be it resolved, That the Chairman be and he is hereby authorized to purchase such car as in his judgment may be necessary for his use in inspecting State roads, payment therefor to be made from funds derived from sale of surplus war materials.

Lake County—Road No. 22

Upon motion of Mr. Schilling, seconded by Captain Hillman, the following resolution was adopted:

Resolved, That the Chairman of this Department be and he is hereby authorized upon the location of State Road No. 22 in Lake County to request the County Commissioners of said county to furnish the right of way therefor, and that he be and he is hereby further authorized, without further reference to this Department, to take all necessary steps, and authorize all necessary actions for condemning such part of said lands for the right of way for said road as he may find it necessary to acquire by condemnation.

Taylor County—Road No. 19

T. W. Puckett, chairman of the Board of County Commissioners of Taylor County, appeared before the Department requesting the assistance of the Department in the construction of an additional bridge across the Steinhatchee River on Road No. 19 between Taylor and Dixie Counties. Upon motion of Mr. Bayliss, seconded by Mr. Schilling, the following resolution was adopted:

OUR SERVICE ON

Contract Bonds

and all other classes of Surety Bonds is unsurpassed.

American Surety Company of New York

Atlanta, Ga., Branch Office, 1320 Hurt Building.
H. N. HUTCHINSON, Manager.

Resolved, That the Chairman of this Department be and he is hereby authorized and requested to investigate the feasibility, advisability and legality of the request made by the representative of Taylor County, and that in the event that he shall find the same feasible, advisable and legal, that he be and he is hereby authorized to proceed to the construction of said bridge.

Volusia County—Road No. 3

Upon motion of Mr. Schilling, seconded by Mr. Bayliss, the following resolution was adopted:

Whereas, the Department has surveyed and located State Road No. 3 in Volusia County, as is shown by plat of said location on file in this office; and

Whereas, said Department has found and determined and does hereby find and determine that it is necessary, wise and expedient to secure, by purchase or condemnation, the real estate hereinafter described for the purpose of a right of way for State Road No. 3;

Now, therefore, be it resolved by the State Road Department of the State of Florida, That the County Commissioners of Volusia County, be and they are hereby requested and authorized to secure for the Department by purchase or condemnation the said lands necessary for said purposes, to-wit:

The East 1/40 (one-fortieth) of the South 1/4 (one-fourth) of the Southwest 1/4 (one-fourth) of Section 33, Township 16 South, Range 30 East.

Or more particularly described as a piece of land lying on the West side of the road 33 feet wide and 330 feet long and bounded as follows: Beginning at a point 1,320 feet (thirteen hundred and twenty feet) East of Southwest section corner, Section 33, Township 16 South, Range 30 East, in said Section line at the intersection of said section line with center line of DeLeon Springs-DeLand road, thence running in a northerly direction along said center line of road a distance of 330 feet (three hundred and thirty feet) to a stake in the center line of road, thence at right angles to said center line of road in a westerly direction a distance of 33 feet (thirty-three feet) to a stake, thence in a Southerly direction 330 feet (three hundred and thirty feet) 33 feet (thirty-three feet) from and parallel to a stake on aforementioned section line, thence with said section line in an easterly direction 33 feet (thirty-three feet) to the beginning, containing in all one-fourth acre, more or

Jack Camp, President. E. F. Fitch, Vice-President. Clarence Camp, Sec. and Treas.

CAMP CONCRETE ROCK COMPANY

Jacksonville

Ocala

Tampa

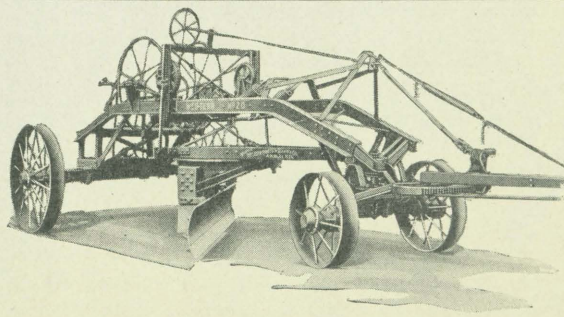
Producers of High Grade Washed, Crushed and Sized

CONCRETE ROCK

"Camp Quality"

Capacity 1,500 to 2,000 tons daily. Quarry four miles east of Brooksville on Atlantic Coast Line Railroad. Our product has been approved for all structural concrete and bituminous macadam.

Sales Offices: 1011 Bisbee Bldg., Jacksonville, Fla.
312 Citizens Bank Bldg., Tampa, Fla.



11,500 Pounds of Grader

Weight alone is not a sufficient guarantee that even a 12-foot grader will stand up behind present-day high-powered tractors, but when the tremendous weight and strength of the Western No. 20 are combined with scientific design, based upon over forty years of experience, and the best of manufacturing facilities, you have a grader that is able to use its 12-foot blade to the limit. That, in a nutshell, is the Western No. 20.

Unsurpassed in weight, strength, ease of handling, efficiency and durability, and built so that it will withstand the strain of the most powerful tractors, you will find it working steadily under the terrific strain of road building in rocky and mountainous regions.

Austin-Western Graders range in weight from 1,000 to 11,500 pounds, and in blade length from 5' to 12 feet. There is sure to be one exactly suited to your needs.

WRITE FOR THE CATALOGUE

The Austin-Western Road Machinery Co.

400 N. Michigan Ave.

Chicago.

less, and being the property of one J. B. Nordman.

Be it further resolved, That said County Commissioners be and they are hereby authorized to use the name of this Department in any condemnation proceedings necessary to carry out the purposes of this resolution, or to proceed in their own name as authorized by law; and

Be it further resolved, That in the event that they should elect to proceed in the name of this Department that their attorneys be and they are hereby authorized to prepare, execute and file all necessary pleadings, affidavits and documents in connection therewith.

Contracts Awarded

Upon motion of Mr. Schilling, seconded by Mr. Bayliss, the following resolution was adopted:

Whereas, bids were asked by the Department for the construction of the projects hereinafter designated, and

Whereas, the firms and persons respectively named were low bidders thereon; now therefore, be it

Resolved, That the Chairman be and he is hereby authorized to execute and enter into contract as follows:

Project 613, Road 5, Sarasota County; sheet asphalt; awarded to Broadbent Construction Company, Ocala; \$209,156.04.

Project 595, Road 3, Volusia County; grading and drainage structures; awarded to J. L. Hunter, Madison; \$25,802.24.

Project 586, Road 1, Jackson-Washington Counties; grading; awarded to J. N. Gillis Construction Company, St. Augustine; \$26,152.00.

Project 625, Road 5, Citrus County; overhead crossing; awarded to Ed Pettus, Ramer, Ala.; \$3,190.

Upon motion, duly carried, the expense accounts of the members were ordered paid.

There appearing no further business, the Department was adjourned.

THE FIVE MILLION DOLLAR ROAD PROGRAM IN LAKE COUNTY

(Continued from Page 6)

Cassis; extension of the road from Cassis to Crows Bluff, through an entirely virgin territory that has been recently largely colonized by a large group of service and ex-service men; rebuilding of the old asphalt road to Sanford with concrete. District No. 10, in all, will expend the sum of \$650,000.

In addition to the above program that will be built entirely by Lake County, the State Road Department is proceeding with the construction of the three branches of State Road No. 2, that will run through the county as follows: one through Lisbon and Grand Island to Eustis and Mount Dora as originally designated; another with Federal aid from Silver Lake Forks through Tavares to Mount Dora, and a third from Helena Run, below Leesburg, via Okahumpka and Mascotte to Groveland and the Polk County line.

THE RESPONSIBLE CONTRACTOR

(Continued from Page 11.)

tions not to overload any contractor with equipment which he does not need.

Contractors! Refrain from bidding on contracts

which you do not have the equipment or resources to handle. Don't undertake any job at an unprofitable price.

Participating in the conference were committees representing: American Association of State Highway Officials, American Institute of Architects, American Institute of Consulting Engineers, American Society of Civil Engineers, American Society of Mechanical Engineers, American Society for Municipal Improvement, Associated General Contractors of America, Highway Industries Exhibitors Association, National Association of Casualty and Surety Agents and the Surety Association of America (Committee on Better Underwriting). All of these organizations are interested in stabilization of the construction industry.

Broken contracts and broken contractors are a detriment to the construction industry. Too often a contractor will skimp his work when he finds that he is losing money. In highway work the best construction should be accomplished and plans and specifications should be followed by the road builders. When highway departments select contractors of experience, ability and reputation highways uniform in quality will be more general, bond companies will have fewer contracts to complete due to failure of the bonded low and inefficient bidder, and the road builders will be able to make a fair profit on their work.

Every one having the letting of contracts for construction work should study the report of the committee which may be obtained from the Autocar Co., Ardmore, Pa., and should obtain a set of the standard questionnaires, study them and use them.—The Highway Engineer & Contractor.

ATTITUDE OF THE STATE ROAD DEPARTMENT TOWARDS ITS CONTRACTORS

(Continued from Page 5.)

Chairman and those gathered at the conference that immediately a supply would be promptly placed at the service of the shippers.

The producers of the rock used in the construction of highways likewise showed a willingness to co-operate in this all-important, all-State enterprise. Everyone seemed to get the spirit expressed by the Chairman that the development of the State in its continued progress, depends upon the early completion of the State System, that good roads affect every citizen, and vitally.

Thoughtless

Two men, renowned for their laziness, were shuffling along in a timber yard. The foreman asked them where they were going.

"Just takin' this plank up to the mill," answered one of them.

"Plank!" said the foreman. "I don't see any plank."

Whereat both men glanced down at their hands, then over their shoulders, and finally at each other's faces.

"Blowed if we ain't gone and forgotten the plank!" said the spokesman.

ROMANCE OF THE ROAD

(Continued from Page 17.)

truck and automobile stage has created such a colossal revolution in modern transportation that many hundreds of miles of highway have been built without sufficient thought as to how to provide for the increase of traffic. The result has been that a great part of these roads disintegrated and had to be rebuilt. Modern science and engineering has taught us that it is cheaper to build roads with a view to making them take care of a greatly increased traffic. While it is not possible to emulate the example of the ancient Romans or Egyptians, it still is not only possible, but practical to take a leaf from their experience.

Concrete, asphalt and brick still maintain the supremacy as road building materials, the old Roman roads being in their way a sort of rough concrete in some of their layers. The striking advance in road making machinery has made the building of modern highways a less complex proposition than it was in olden times, the machinery, to a very large extent, having superseded manual labor in that respect.

To the thoughtful man no study of modern times is more productive of education than the progress which has been made in modern road building, and the effect it has had on the prosperity of both the United States and foreign countries.

The "Romance of the Road" is indeed a fascinating study and one which will well repay careful inquiry and research. It is one of the foundations on which our progress rests, and with the advancing years will become a more essential and vital portion of our national economy.

NEW TYPE OF ROAD SAVES CONCRETE

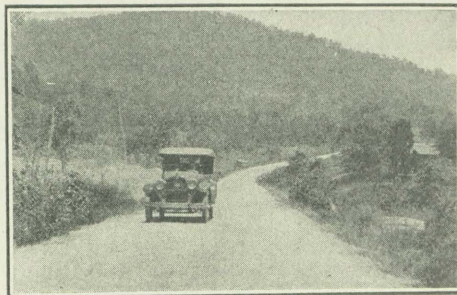
Twenty-four states have adopted as standard the design of cement roads worked out by the Highway Research Board. This design is only one of the many improvements in road-building made possible by the research of this organization.

This new type of cement road is very thin at the center but thick at the edges. Although this new design quite reverses the former design, whereby the road was thicker at the center, it not only makes a much stronger road but saves about 390 cubic yards of concrete per mile. At \$10.00 per cubic yard for concrete this saving amounts to \$3,900 per mile, or, if we assume that the twenty-four states will build 2,400 miles of concrete road that this year the saving will be \$9,360,000.

USE FOR OLD INNER TUBES

Old inner tubes may be used for making floor mats. The old tubes are first cut into strips, says The Automobile Digest, by wetting the rubber and cutting with an old razor. The strips are then woven or interlaced with each other, in basket fashion. The end strips are made double width and turned over, and then cemented in place. Brass rivets, placed along the edges will improve the appearance, in addition to making the mat stronger.—Ex.

For Better Roads



The two-five mile sections laid with

"ENSLEY" & "ALA CITY"
BASIC SLAG
CRUSHED & SCREENED

are in fine shape

During 1923-24 three experimental five-mile sections, using three different types of Asphalt pavement, were laid in Jefferson County (Ala.) on the Roebuck-Chalkville road.

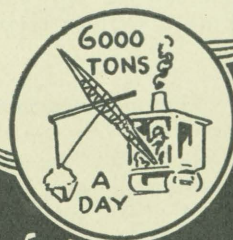
In the first five-mile section a Hot Mixed Slag Asphalt was used (1½ in. Warrenton Bitulithic surface) on 2½ in. bituminous slag concrete base.

In the middle section the engineers used Emulsified Asphalt—cold mixed asphalt with gravel and stone screenings.

An old chert macadam road was used as base for the last section (photo above) and on this a 3-inch Penetration Slag Macadam surface was laid. Results are already proving the greater resistance to traffic of the two sections laid with Basic Slag.

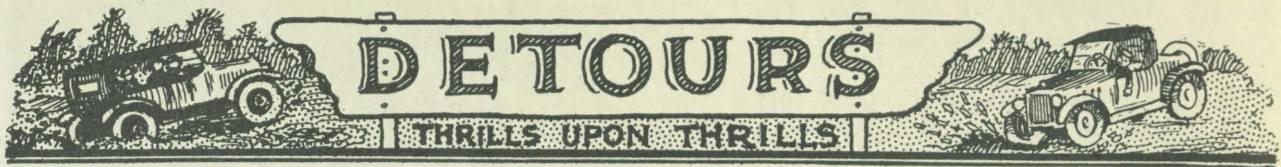
New Branch Offices:

Montgomery
Orlando



BIRMINGHAM
SLAG CO.

Slag Headquarters for South
ATLANTA · BIRMINGHAM · THOMASVILLE



Wrong Store

Customer: "Hove you any Lincoln Shock Absorbers for 'Coles'?"

Clerk: "No, sir, it's Bromo Quinine for colds."
—H. G.

The young mother was bathing her baby, when a neighbor's girl came into the room carrying a doll, and stood watching the operation for some time. Dolly was the worse for wear, being minus an arm and a leg. "How long have you had your baby?" she said to the mother.

"Three months," said the proud young mother.

"My, but you have kept her nice," replied the child with an envious sigh.—Woman's World.

Making the Goal

There are two ways to reach your goal: the first is to put your shoulder to the wheel; the second, not to buy that kind of a car.—College Humor.

Eph: "What am de difference between a' old man, a young man, an' a worm?"

Mose: "Nuffin. Chickens gets 'em all."

Sister: "Bob, will you get my watch? It's up-stairs."

Brother: "Aw, wait awhile, it will run down."

Sister: "No, it won't, my dear, ours is a winding staircase."

"Hello!" said the Chestnut to the Robin. "What are you?"

"I'm a little bird," said the Robin. "What are you?"

"I'm a little burred, too," said the Chestnut.

Let Wife Hide It

"You're lookin' bad, Wallie."

"Bye, I've been in the hospital an' the doctors have taken awa' ma appendix."

"These doctors 'll take 'onything. It's a peety ye didna have it in yer wife's name."—Bison.

Moves

Captain: "If anything moves, shoot!"

Sentry: "Yessah; an' if anything shoots, Ah move."

Mystery

"How do you sell this limburger?"

"I often wonder myself, ma'am."

—Medley.

The kind old gentleman met his friend Willie in the street one very hot day.

"Hello Willie," he exclaimed, "how is your Grandpa standing the heat?"

"Ain't heard yet," said Willie. "He's only been dead a week."

Apt

He was wandering around aimlessly in a department store when the floor walker approached him.

"Looking for something?" he asked.

"Yes, my wife," replied the man.

"Would you mind describing her, please?"

"Well, she's a sort of limousine, with heavy tread, and usually runs in low."—Penn. Punch Bowl.

Chauffeur (to slightly deaf farmer): "Can you tell me where I can get some gas?"

Farmer—"Hey?"

Chauffeur: "No, gas! This ain't a horse, it's an automobile."

The Exact Difference

"Father," said the conventional small boy, "what is the difference between a pedestrian and a jay-walker?"

"A pedestrian," returned the conventional father, "is a person who walks when you are walking. A jay-walker is a person who walks when you are driving."—The Kablegram.

Isn't it about time for some one to get out a report on the deleterious effect of pedestrians on the bumpers and radiators.—Little Rock (Arkansas) Gazette.

"Next Winter to Be Worst in 216 Years, Says Savant."—Headline. More Florida real estate propaganda?—Chicago Daily News.

All the Luck

Oh, happy, carefree firefly,

You worry not a bit,

For if you see the village cop

You know your tail-light's lit.

—Mrs. H. E. V.

Don't think the train has passed just because you see its tracks.—Oakland County Motorist.

Possibly the Other Half

As a rule a drunken driver will give you half the road, but you are never sure which half he intends to give you.—Baudette Region.

A recent movie comedy showed on the screen a bevy of shapely girls disrobing for a plunge in the "old swimming pool." They had just taken off their shoes, hats, coats and were beginning to—a passing freight train dashed across the screen and obscured the view. When it had passed, the girls were frolicking in the water.

An old railroader sat through the show again and again. At length an usher tapped him on the shoulder.

"Aren't you ever going home?" he asked.

"Oh, I'll wait awhile," was the answer. "One of these times that train's going to be late."—Kreolite News.

FLORIDA'S BEST BUILDING SAND

For Class "A" Concrete
Stucco, Mortar and Plaster

SCREENED, GRADED AND DOUBLE WASHED
APPROXIMATELY 30% STRONGER THAN
STANDARD OTTAWA

35 TO 40 CAR
DAILY CAPACITY

ORDERS FILLED
WITHIN 24 HOURS

INDORSED BY LEADING ARCHITECTS, EN-
GINEERS AND CONTRACTORS
WIRE, WRITE OR PHONE

Diamond Sand Company

W. R. FULLER, SALES AGENT,
TAMPA

Motors
Run Smoother on
**CROWN
GASOLINE**
—AND—
**POLARINE
OIL**

STANDARD OIL COMPANY
INCORPORATED IN KENTUCKY



Linden Ave., Brooklyn, N. Y. Elastite Ex-
pansion Joint used. Necaro Co., Inc., Brook-
lyn, Contractor.

Properly built concrete highways are a profitable
and safe civic investment. The dangers of cracking
and failure through expansion and contraction are
eliminated by adequate use of Carey Elastite Ex-
pansion Joint.

Write for 72 page book on use of Expan-
sion Joint and handy Elastite scale.
Warehouses in all principal cities insure
48 hour deliveries of Carey Elastite to
any job anywhere.

THE PHILIP CAREY COMPANY

74 Wayne Ave., Lockland, Cincinnati, Ohio

**Carey
Elastite**

Elastite Expansion Joint is an elastic resilient material composed of two sheets of asphalt-
saturated felt between which is "sandwiched" a body of carefully refined asphaltic compound.



Ocala Lime Rock—Florida's Natural Road Material

Ocala Lime Rock Co.

INCORPORATED

OCALA, FLORIDA

LIME ROCK QUARRIES

Kendrick, on A. C. L. R. R. Santos, on S. A. L.
R. R.

Daily Capacity Plants, 4,000 Tons.

Office: Jones Building,
Ocala.

Telegraph: Ocala. Phone 264.

Florida Highways

Status of Road Construction

THROUGH JULY 31, 1925.

Project No.	Contractor.	Road No.	County	Total Length Miles	Clearing Miles	Grading Miles	Base Miles	Surface Miles	Per Cent Type Complete
26	C. F. Lytle.....	2	Columbia	11.01				8.41	C. 76.40
37-D	Fla. Drainage & Const. Co..	2	Alachua	2.14	2.14	1.80			G. 86.60
40-A	C. F. Lytle.....	4	Brevard	16.17	15.84	14.55	12.94	0.00	S.T. 86.00
43	Wm. P. McDonald Const Co.	2	Marion	10.44	10.44	10.44	10.44	2.71	S.A. 63.20
44	Southern Pav. & Const. Co.	2	Lake	10.53	10.53	10.53	10.53	10.42	B.C. 99.00
46	B. Booth & Co.....	3	Nassau	11.52	10.95	4.03			G. 36.90
47	Boone & Wester	4	St. Johns	14.96	3.14	.75			G. 12.50
514	State Forces	1	Jackson	11.00					S.C. 10.50
534-A	J. D. Donahoo & Sons.....	24	Brevard	2.65	2.65	2.52	2.12	1.19	S.T. 95.00
534-B	Noll & Noll.....	24	Brevard	11.85	11.85	11.85	10.07	8.00	S.T. 85.00
564-A	Broadbent Const. Co.....	5	Charlotte	10.88	10.66	9.25	8.48	0.00	S.T. 89.00
567	State Forces	1	Walton	21.35	20.93	14.30		6.93	S.C. 57.80
571	Hunter & Gladwell.....	1	Madison	14.73	14.73	14.73		14.00	S.C. 97.50
576	S. T. Buchanan & Broadbent Const. Co.....	5	Sarasota	5.68	5.68	5.51	5.51	5.51	S.T. 98.00
581	Barnes & Smith.....	5	Hillsborough	12.10	7.50	6.05	.85	0.00	S.T. 16.00
586	State Forces	1	Jackson-Washington	17.37	12.16	10.42		9.72	S. C. 72.40
588	Morgan-Hill Paving Co.....	8	Putnam	2.34	2.36	2.36	2.29	1.19	S.A. 76.40
597	J. Y. Wilson.....	4	Volusia	16.29	16.29	13.50	11.40	0.00	S.T. 85.00
604	C. F. Lytle.....	4	Volusia	7.72	7.72	6.72	6.17	0.00	S.T. 96.00
607-B	Whitney Const. Co.....	13	Clay	6.76	6.76	6.76		0.00	S.T. 39.00
608	C. F. Lytle.....	4	Brevard	9.25	9.25	9.25		9.16	C. 98.00
612	State Forces	1	Leon	17.58	16.58	16.70		15.47	S.C. 87.76
613	State Forces	5	Sarasota	4.62	4.39	4.00			S.A. 27.00
617	Taylor & Cox	5	Alachua	5.17	1.03	.77			G. 13.50
618	J. R. & J. B. Miller.....	5	Alachua	10.89	1.41	.44			G. 3.90
623	State Forces	35	Madison	12.91	5.29	4.31		0.00	S.C. 21.20
627	State Forces	2	Putnam	6.27	4.39	3.13		0.00	S.T. 19.86
628	L. M. Gray.....	3	Volusia	9.92	9.92	9.42		0.00	S.T. 30.00
629	H. E. Wolfe.....	8	Highlands	6.00				0.00	S.T. 0.00
630	Myers Construction Co.....	8	Highlands	11.00			8.80	5.50	S.T. 70.00
633	Taylor Contracting Co.....	1	Gadsden	9.67	1.44	.67		0.00	S.C. 5.00
634	State Forces	1	Jackson	11.07	6.09	5.53		3.38	S.C. 45.30
636	C. F. Lytle	8	St. Lucie	12.20			6.10	0.00	S.T. 50.00
637	State Forces	10	Leon	18.08	14.46	8.14		1.81	S.C. 42.30
638	S. G. Collins.....	1	Santa Rosa .....	.34		.06			G. 18.00
639	Taylor Contracting Co.....	1	Gadsden	9.83	.98	.98		0.00	S.C. 11.90
642	B. Booth & Co.....	3	Putnam	10.82	.59	0.00			G. 6.00
647	O. Hardin & H. E. Wolfe..	8	Highlands	7.00		5.88	0.00	0.00	S.T. 9.00
651	State Forces	6	Calhoun	14.72	6.62	4.56		0.00	S.C. 13.00
655	State Forces	18	Highlands	13.26	7.16	3.58			G. 30.00
661	Southern Paving Const. Co.2-A	Lake		3.52	.70	.39	0.00	0.00	S.A. 3.00

TOTAL MILES COMPLETE

	Concrete	Brick	B.C.	S.A.	B.M.	Asp. Blk	S.T.	S.C.	Marl	Grad.	Total
Complete June 30, 1925.....	121.13	12.44	10.51	49.04	71.50	23.20	309.98	338.10	37.08	46.72	1019.70
July, 1925	2.59		.12	1.71			8.68	4.10		4.97	22.18
Total to date	123.72	12.44	10.63	50.75	71.50	23.20	318.66	342.20	37.08	51.69	1041.88

	Clearing Miles.	Graded Miles.	Base Miles	Surface Miles.
Complete June 30, 1925	1,102.41	1,062.90	411.60	991.53
July, 1925	10.84	12.31	9.76	18.67
Total to date	1,113.25	1,075.21	421.36	1,010.20

Note—The above tabulation shows only those projects that are actually under construction at the present time and does not show projects that have been previously completed. However, the table, "Total miles completed," at the foot includes all projects that have been completed prior to July 31, 1925, and the amounts completed in July also. The abbreviations used are as follows:

C.—Concrete. S.A.—Sheet asphalt. B.M.—Bituminous macadam. R.—Rock base. S.C.—Sand clay. G. & D.—Graded and drained. S.T.—Surface treated. B. C.—Bituminous concrete.

*Permanent
roads are a
good investment
—not an expense*

—and No Place to Go!

We find ourselves, almost without realizing it, a nation on wheels.

We drive or ride in more than 17,000,000 motor vehicles.

We pack the paved highways coming in and out of town. We over-run even so-called remote regions. And we are pounding to pieces all but permanent roads.

This year probably 4,000,000 new cars will be on the road. Compared to this increase, the mileage of new permanent roads will be insignificant.

We don't want to be a nation on wheels, with no place to go.

The answer is, build more, and where necessary, wider concrete roads—*and start building them now.*

Not in a long time have general conditions been so favorable for carrying on such public works as permanent highway building.

Your highway authorities are ready to carry on their share of this great public work. But they must have your support.

Tell them you are ready to invest in more Concrete Highways, now.

PORTLAND CEMENT ASSOCIATION

Graham Building
Jacksonville, Fla.

*A National Organization to Improve and Extend
the Uses of Concrete*

Offices in 30 Cities

Reinforcing Bars for Concrete

Made in the United States
from new billet steel.

Intelligent, dependable service
by expert bridgemen.

Dudley Bar Company

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Wood Preservers Since 1878

Eppinger & Russell Co.

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Forest Products of all kinds

Ties, Lumber, Piles, Poles, Cross Arms
for Railroads, Bridges, Docks, Fences,
and other purposes where permanent
construction is required.

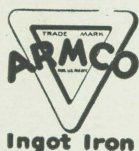
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Information and Quotations Cheerfully Given.
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SOUTH of Fort Pierce, along the Dixie Highway, is this sturdy Armco Corrugated Culvert—one of many used in this manner to spill drainage from the roadbed into the Indian River, preventing erosion of the embankment. The three views of this same culvert give an idea of the adaptability of Armco Culverts.



DIXIE CULVERT & METAL CO.

Jacksonville, Florida

**Wm. P. McDonald
Construction Co.**

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